

Hydrogeologic Characteristics of the Columbia River Basalts near Goldendale, Washington

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Presentation Abstract

- Basalt hydrogeology varies
 - Yield
 - Water quality
- Basalt deposition, recharge mechanism, and geologic structure affect hydrogeology
- Recent drilling explorations have . . .
 - Helped delineate basalt stratigraphy
 - Improved understanding of hydrogeology
 - Facilitated water-supply development

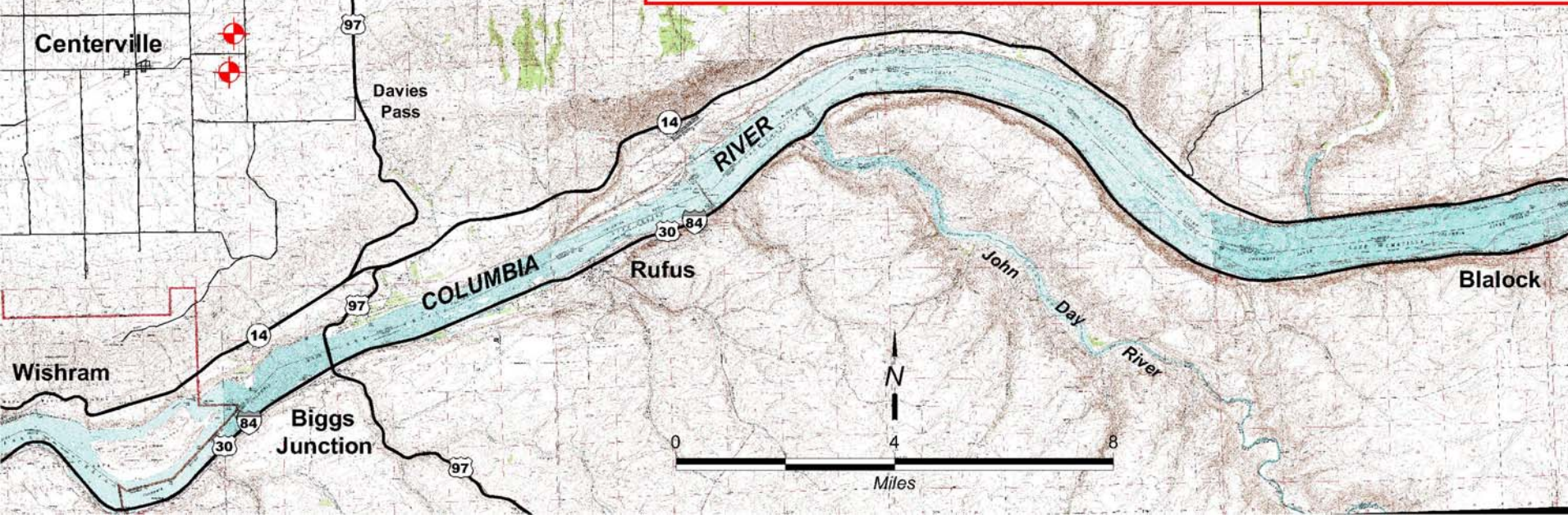
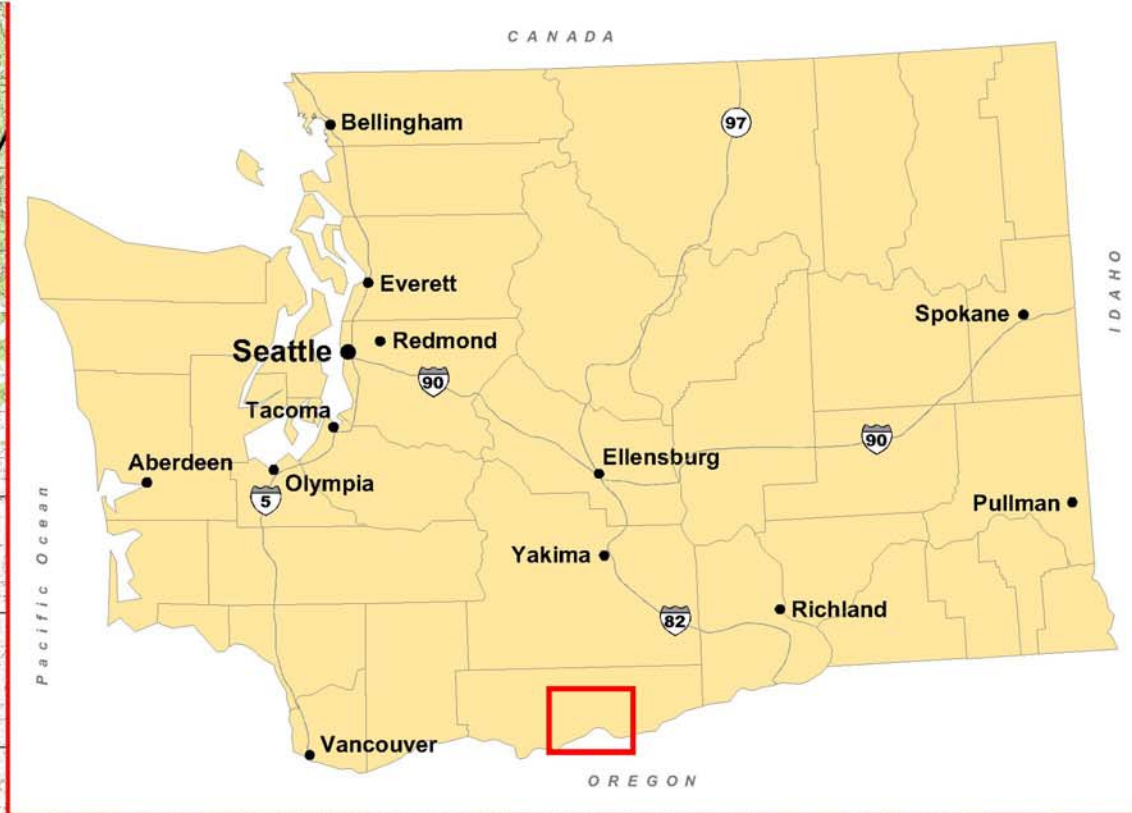
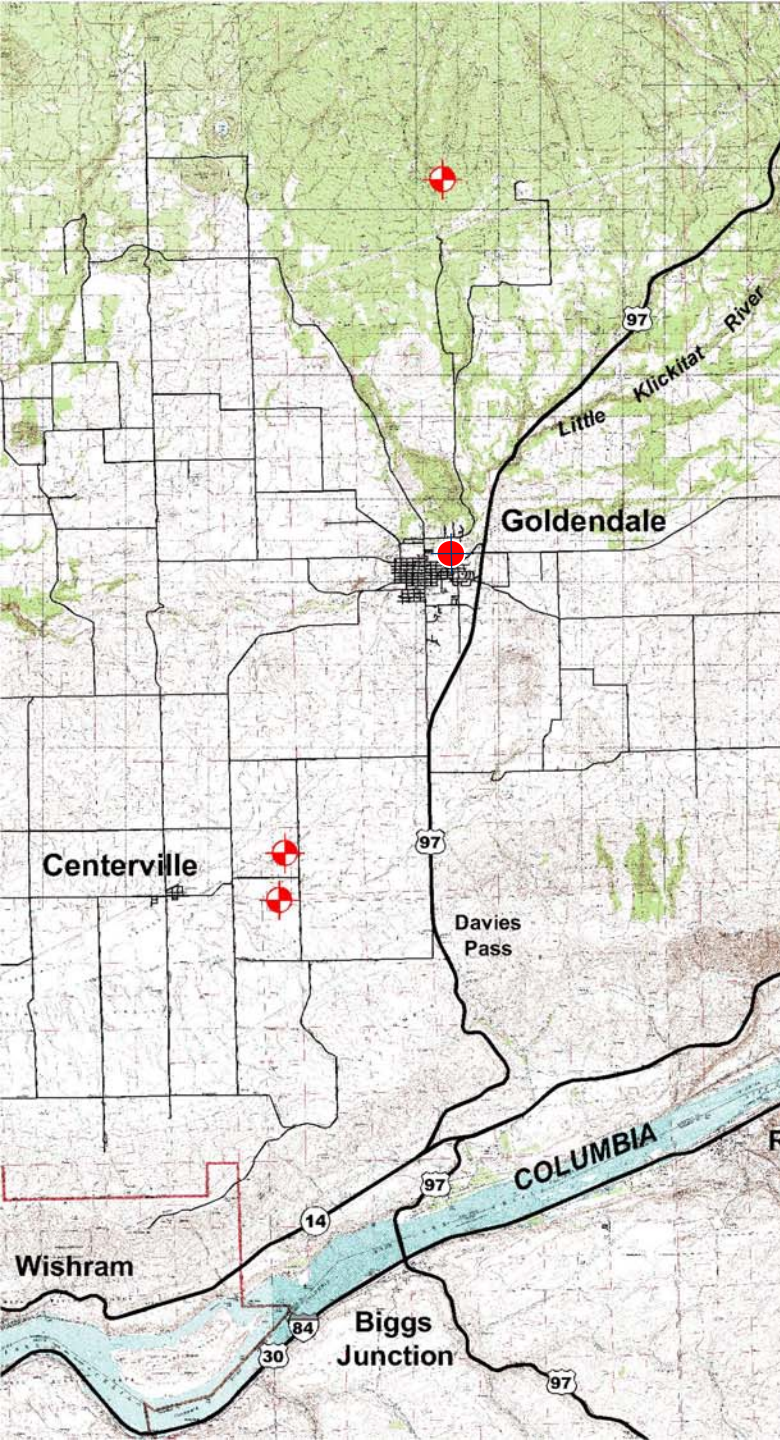
Reason for Exploration

- Existing water supply is problematic
 - Spring-water supplies ...
 - Are susceptible to drought
 - Have water quality concerns
 - Local ground water has marginal quality
- Diversify water supply sources to ...
 - Augment or replace existing supplies
 - Meet future municipal demands

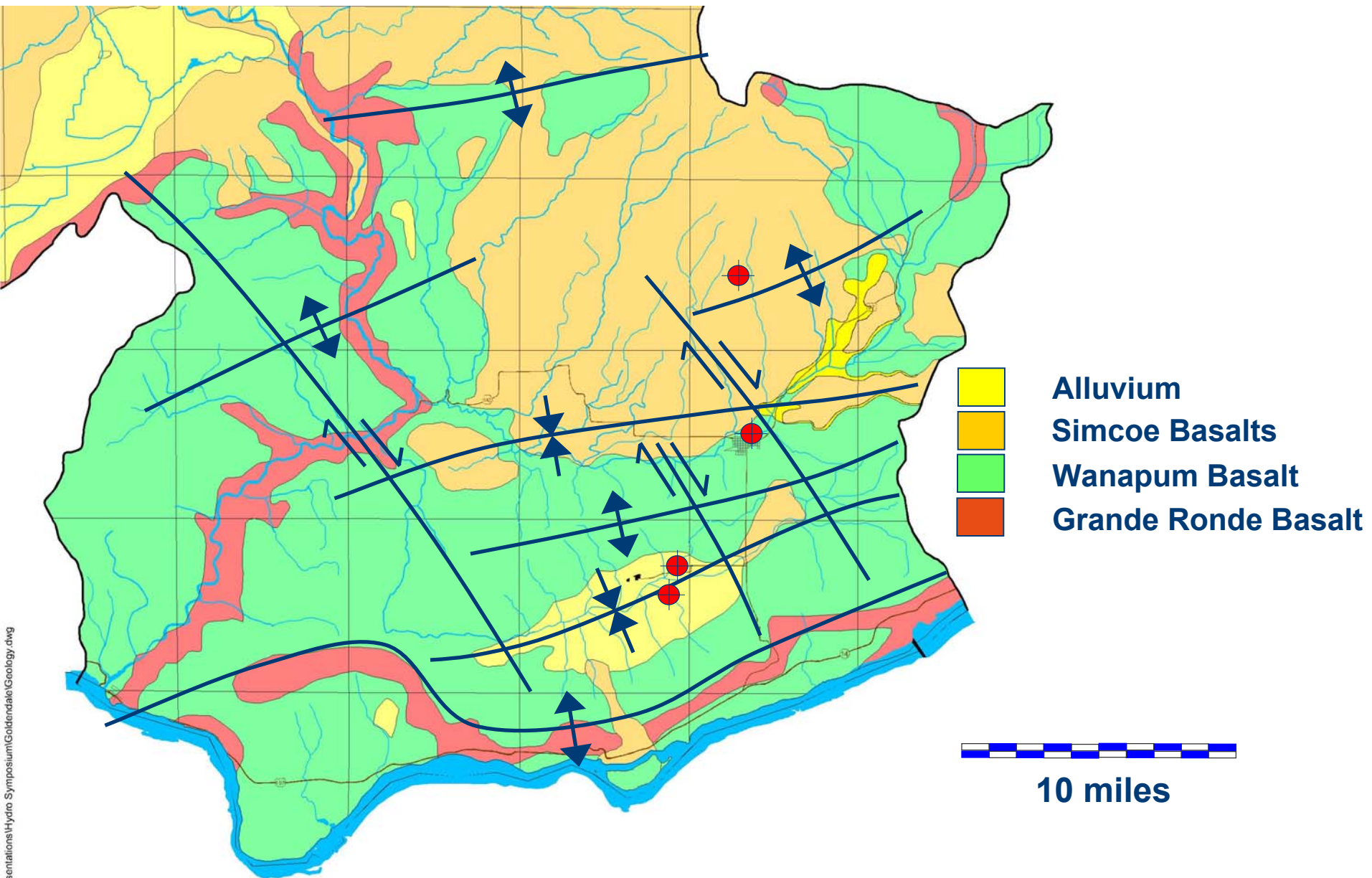
Exploration Objective

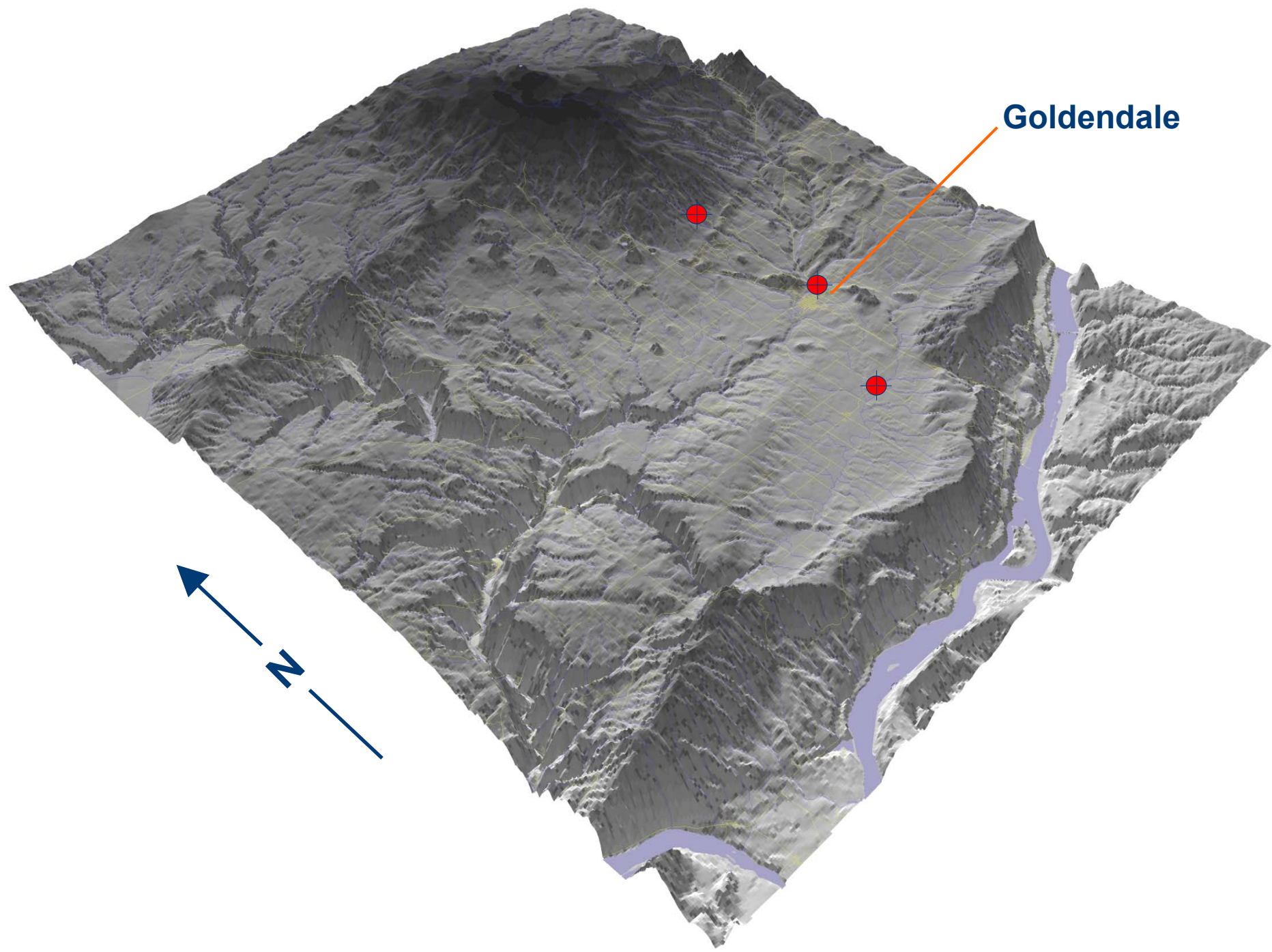
Develop new water supplies from the basalt aquifer

- There are two exploration areas
- The Wanapum Basalt is the primary target
- Young volcanics and the Grande Ronde Basalt are secondary targets



Surficial Geology





Goldendale

Alluvium

Priest Rapids

Rosalia

Roza

Sub-Type IIA

Sentinel Gap

Wanapum Basalt

1,000 gpm, 4 gpm/ft

100 ppm TDS

Frenchman Springs

Sand Hollow 1

Sand Hollow 2

Ginkgo

Minimal Head Change

Grande Ronde Basalt

200? gpm, no change in TDS

Swale Creek Wells

1,000 feet

Alluvium

Priest Rapids

Roza

Sentinel Gap

Wanapum Basalt

500 gpm, 2 gpm/ft

200 ppm TDS

**Frenchman
Springs**

Sand Hollow

Ginkgo

Large Head Change

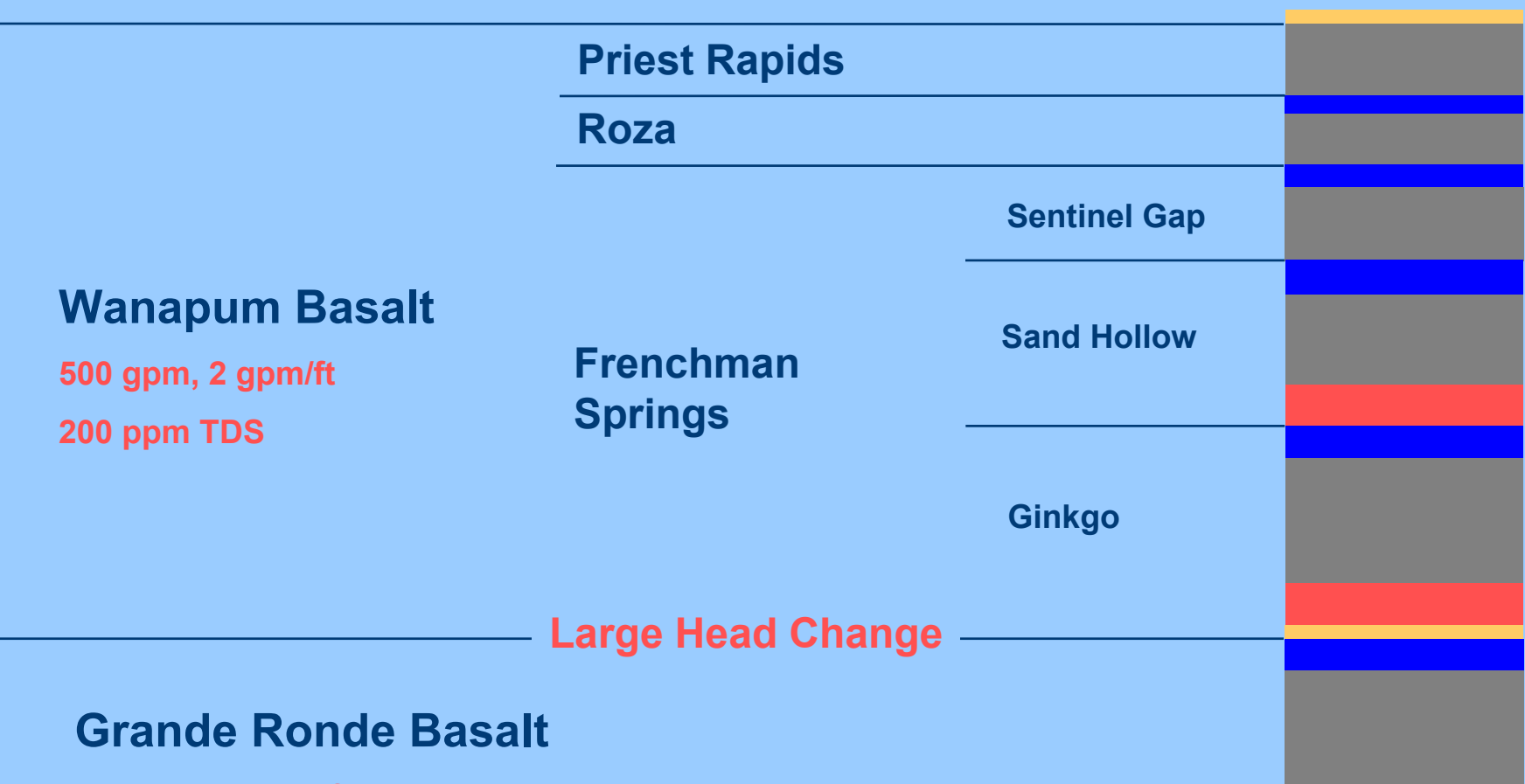
Grande Ronde Basalt

800 gpm, 4 gpm/ft

500 ppm TDS

Third Street Well

1,000 feet



Simcoe Well

Simcoe Volcanics

1,000 gpm, 40 gpm/ft

50 ppm TDS

Large Head Change

Priest Rapids

Lolo

Rosalia

Wanapum Basalt

50 gpm, < 1 gpm/ft

High (?) TDS

Frenchman Springs

Sand Hollow 1

Sand Hollow 2

Moderate Head Change

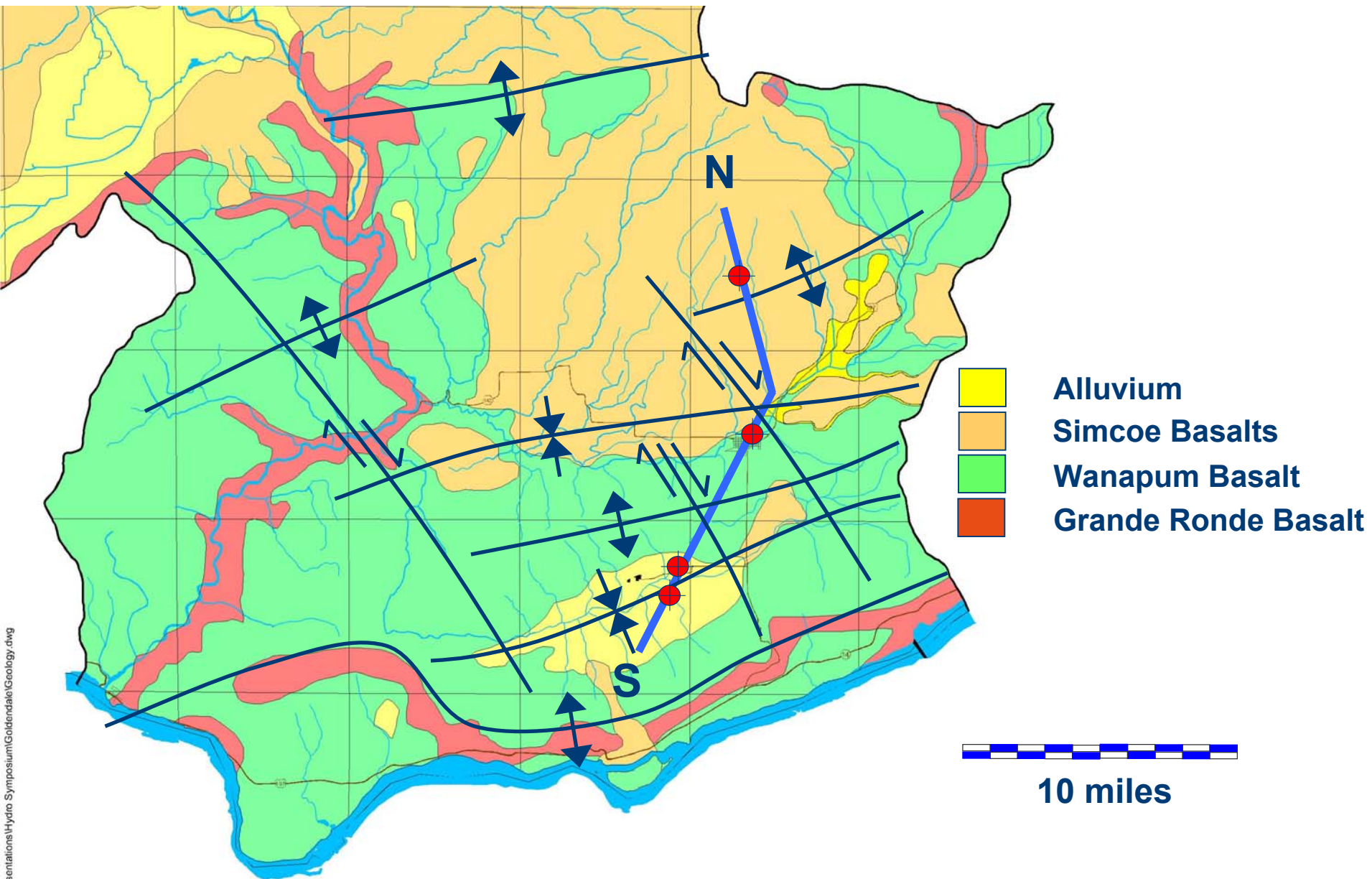
Grande Ronde Basalt

2,000 gpm, 8 gpm/ft

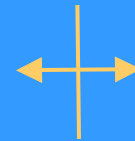
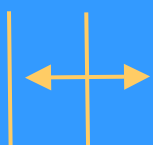
1,300 ppm TDS

1,500 feet

Cross Section Location



S



N

SC: 40

TDS: 50

Swale
Creek

Goldendale

Simcoe
Volcanics



SC: 4

TDS: 100

SC: 2

TDS: 200

SC: <1

TDS: High?

Wanapum
Basalt

SC: ??

TDS: 100?

SC: 4

TDS: 500

Grande Ronde
Basalt

SC: 8

TDS: 1,300

Summary

Hydrogeologic interpretation is based on multiple lines of evidence

- Yield is influenced by ...
 - The presence/absence of basalt flows and the nature of flow tops and pillows
 - The degree of vertical connection among basalts
- Water quality is influenced by ...
 - Residence time
 - Proximity to recharge source

